THE POWER OF INNOVATION ON PERFORMANCE AND SOCIO-ENVIRONMENTAL SUSTAINABILITY

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Abstract

Purpose: *This study has analyzed the relationship between process and organizational innovation, performance in product, market and technical innovation and social environmental sustainability.*

Design/methodology/approach: *The data was collected in industrial companies using a questionnaire with a Likert scale and a structural equation model was used to estimate the parameters.*

Findings: *The results indicated that process and organizational innovation mediated by performance in product, market and technical innovation, influence social and environmental sustainability.*

Practical implications: *According to the investigated managers, the practical contributions point to the need of considering innovation elements to achieve a good performance. Subsequently points out that better performing organizations favor practices to seek the global sustainability of the enterprises.*

Originality/value: *The model used in this study, is broader than that applied in previous studies when considering the dimensions of innovation, performance and sustainability concurrently. Thus, it suggests the understanding, by the interested parties, about organizational performance as an influence of good socio-environmental sustainability practices.*

Keywords: innovation; performance; sustainability.

1. Introduction

Innovation promotes the development of countries and companies (Kahn, 2018; Gunday *et al*., 2011) and often increases the concern about social inequality and the finitude of natural resources. This happens because innovation promotes alternative ways of using resources that are harmful to the environment (Bocken *et al*., 2019; Silvestre and Tîrca, 2019).

A favorable scenario is created in companies that combine knowledge, technology, and sustainability in the innovation of products and services (Gunday *et al*., 2011; Tidd and Bessant, 2015). Innovations need to add socio-environmental factors to the economic interests, seeking to achieve in practice the full and inseparable integration between innovation and sustainability (Nidumolu *et al*., 2013; Albareda and Hajikhani, 2019).

Sustainability-oriented innovation (SOI) presents multiple ways to link a sustainable individual leadership and the entrepreneurship to other levels of organizational transformation, leading the transition systems towards a sustainable development. The challenge is turned into business opportunities for those seeking innovative and sustainable solutions (Bocken *et al*., 2019).

Companies that develop products, services and processes with socio-environmental concerns improve economic, environmental, and social performance (Nidumolu *et al*., 2013; Kneipp *et al*., 2018; Albareda and Hajikhani, 2019). Innovations that include the optimization of raw materials, use of recyclable materials and components with low environmental impact provide efficiency in the use of natural resources and cost reduction for companies, which promotes greater economic and environmental results (Lin *et al*. , 2013; Ramadani *et al*., 2019).

Process innovation affects the economic performance of companies and when combined with environmental sustainability practices, improves environmental performance by reducing the waste of water, energy, and raw materials. An example is the implementation of software that supports production and transport and reduces the waste of fossil fuels (González-García *et al*., 2012; Kneip *et al*., 2018).

Organizational and marketing innovation combined with socio-environmental practices have the potential to improve economic, social, and environmental performance. The new techniques for promoting products with returnable and biodegradable packaging enhance sustainable actions and improve the company's relationship with its stakeholders, which helps to open new markets (Nidumolu *et al*., 2013; Guerrero-Villegas *et al*., 2018).

Despite the great interest of innovation in the promulgation of sustainable practices, a known stimulus factor is the economic performance. In this scenario, companies that seek sustainability-oriented innovation need to prioritize the economic performance so that the resources in innovation are sufficient. In this context the objective of the investigation is to analyze the relationship between process and organizational innovation, performance in product, market and technical innovation and social environmental sustainability.

In large corporations, sustainability-oriented innovation has already been discussed since the late 1980s. However, in the last decades, Micro, Small and Medium companies have been the target of studies due to their representativeness in the world market and their flexibility to adapt, what makes them major contributors to sustainable development (Klewitz and Hansen, 2014).

Considering the context suggested by Klewitz and Hansen (2014), industrial companies in the Chapecó region were investigated. The region choice is justified by the economic relevance that the Chapecó region represents for the state of Santa Catarina. Also, according to SEBRAE (2013), the Western macro-region occupies the 4th place in the formation of the state GDP and Chapecó is its main city. The SEBRAE (2013) survey points out that 98.90% of the companies in the region are micro and small.

A challenge for managers is to find a way to make the company more sustainable considering the Triple Bottom Line (TBL) aspects. There is an imaginary trade-off between the adoption of sustainability practices and the company's profitability, or the need to give up the company's competitiveness to make it sustainable (Nidumolu *et al*., 2013; Adams *et al*., 2016). Also, many managers have not yet developed the conditions or do not have the capabilities to make their business more sustainable from a socio-environmental point of view (Adams *et al*., 2016).

This study's development justificative is presenting an empirical evidence that innovation combined with economic performance can improve socio-environmental practices. The approach of the study fills a literature gap on Sustainability-oriented innovation (SOI) related to small and medium-sized companies. The results of the study can be of academic and managerial interest. When seeking innovation, managers tend to increase economic performance, what leads to more financial resources that could be applied in socio-environmental practices, promoting an improvement in the company's image, for example. The originality of the research is in the breadth of considering simultaneously organizational and process innovation, economic performance, and sustainable practices in the environmental and social dimensions. This contribution helps to supply the observation made by Das (2017) that when considering the aspects of innovation most studies consider only the economic performance.

2. Theoretical Background and Hypothesis

The theoretical foundation of the study discusses the relationship between innovation and sustainability, innovation and performance, performance and sustainability and innovation, performance, and sustainability.

2.1 Process and Organizational Innovation (POI) and Social and Environmental Sustainability (SES)

The Oslo Manual defines that innovation can develop and improve processes in production activities, product delivery time and production support. The concept of organizational innovation includes the quality and efficiency improvement in the development of tasks, caused by organizational communication, learning capacity and the use of technologies by the team (OECD, 2018).

The proper approach of process and organizational innovation (POI) has the potential to improve performance in the environmental dimension of companies as new or improved products or services can reduce the emission of polluting gases and the use of harmful materials to the environment. Companies that invest in this type of innovation not only improve their environmental indicators, but also leverage their market share (Lin *et al*., 2013; Huang and Li, 2017).

The literature on Sustainability-oriented innovation (SOI) addresses five key objectives for discussion: strategic, operational, organizational, collaborative (including stakeholders) and systemic

changes in innovation (Albareda and Hajikhani, 2019). There is a growing concern and interaction between business management and research in the Sustainability-oriented innovation (SOI) area, managers are making changes towards this type of innovation while exploring new business models and creating or "co-creating" sustainable products and/or services (Albareda and Hajikhani, 2019).

According to González-García *et al*. (2012), eco-innovation in products can be a way to reduce the environmental impact of companies by developing an ecological product design. However, it will only occur if the design has ways to reuse residues, optimize raw materials and reduce energy use (González-García *et al*., 2012; Kneipp *et al*., 2018).

In general, Sustainability-oriented innovation (SOI) constantly seeks processes that improve the economic, social, and environmental aspects involved in creating value. It is suggested that in the future the "Innovation for Sustainability" research field will no longer be necessary, considering that every innovation will be in accordance with the Triple Bottom Line (Bocken *et al*., 2019).

In a qualitative study that analyzed the innovation processes combined with the sustainability practices of Brazilian multinationals, Marcon *et al*. (2017) the results suggested that companies have invested in actions to raise awareness about the importance of caring about the environment among suppliers, customers, and the community. The study highlights the
Natura case, a company that invests in innovation centers and finances research on biodiversity, agronomy and sustainability, and there are other cases that focus on communication strategies for more sustainable and conscious consumption.

To meet the research's objective with the background of the previous literature, the following research hypothesis is presented:

H_1: Process and organizational innovation has a positive and significant relation with social and environmental sustainability.

2.2 Process and Organizational Innovation (POI) and Product, Market, and Technical Innovation Performance (PMTIP)

Innovation is vital for the survival, growth, and competitive advantage of companies (Teece, 2010). According to the OECD (2018) the PMTIP is defined as a welfare or service that is significantly different from the products or services previously marketed by the company.

Tuan *et al*. (2016) found evidence that some types of innovation are more important to improve innovation's performance and this one can improve the performance of the company. Therefore, companies should concentrate their efforts on POI, as they have a positive influence on product, market and technical innovation performance.

In the sequence, Lee *et al*. (2019) found evidence that in low-tech industries the process innovation only has a positive effect in the organization's performance when moderated by organizational innovation. That shows that companies that are more opened to organizational changes tend to get better results from process innovation.

Gunday *et al*. (2011) discuss that in general innovation brings noticeable changes in the performance of companies. When analyzing manufacturing companies, they suggest that managers should focus their

efforts on product and process innovations to achieve sustainable development. Therefore, managers should develop a clear innovation strategy that helps to understand the impact of R&D, innovation itself and of the entrepreneurship in the company's performance (Ramadani *et al*., 2019).

An innovative company is one that has implemented new products or processes over time and requires conditions of novelty and use. It implies that activities that collaborate with the innovation process are successful if a product innovation was obtained (Amabile *et al*., 1996; OECD, 2018). Furthermore, innovation is considered an antecedent in the organization's performance. Research indicate that performance is influenced by innovation (Calantone *et al*., 2002; Chapman, 2006; Likar *et al*., 2014; Nambisan, 2013; Nybakk and Jenssen, 2012; Oke *et al*., 2012).

H_2: Process and organizational innovation has a positive and significant relation with product, market, and technical innovation performance.

2.3 Product, Market, and Technical Innovation Performance (PMTIP) and Social and Environmental Sustainability (SES)

Companies that are concerned about sustainability tend to develop governance mechanisms for socio-environmental issues that prioritize stakeholder engagement. To achieve that, companies have developed strategies that benefit the environment and the society by adopting practices such as reports, internal and external communication, analysis of non-financial indicators about employees and the establishment of socio-environmental standards in the selection of suppliers (Eccles *et al*., 2014).

Zhu *et al*. (2016) saw that Chinese state-owned companies that implemented improvements in job security, political responsibility and human rights achieved better social and financial performance. They certificated that these practices brought a positive image to the companies' brand and a greater employee satisfaction at work.

Agudo-Valiente *et al*. (2015) found out a positive relation between the way companies generate interaction and communication with stakeholders and the performance in corporate social responsibility. The establishment of communication channels with the different stakeholders allows the company to identify those demands that can improve the performance of social practices by concentrating efforts on what is important for customers, employees, and the community.

Zhang *et al*. (2019), when analyzing Chinese governmental companies, stated that patents for environmentally friendly products are positively associated with organizational performance. In addition to that, the company's ability to adopt environmental practices focused on reducing the energy consumption and the pollution, as well as the establishment of partnerships with suppliers and other institutions to implement those practices, has a positive impact in market performance.

Annunziata *et al*. (2018) and Gomes *et al*. (2013) say that companies tend to integrate corporate sustainability practices with organizational performance. Despite the model expressed in studies, in which socio-environmental practices influence performance, this study points out that performance influences socio-environmental practices.

We understand performance is made of several dimensions, and unlike financial measures, non-financial measures can provide strategic information, such as some projections to prevent, anticipate and

influence future results, constituting trend indicators. It does not mean that financial measures should be abandoned, but when it comes to evaluating strategies, it is necessary to complement them with non-financial measures (Bititci *et al*., 1997; Gomes *et al*., 2013).

H_3: Performance in product, market and technical innovation has a positive and significant relation with social and environmental sustainability.

2.4 Process and Organizational Innovation (POI), Product, Market, and Technical Innovation Performance (PMTIP) and Social and Environmental Sustainability (SES)

Process innovation makes a positive change in the environmental sustainability of companies as it leads to a higher level of engagement with environmental practices, due to the fact that the company seeks, through these sustainability practices, to stand out in the market (Moyano-Fuentes *et al*., 2017). In the literature there is evidence that an organization's innovation capacity is a key resource to acquire competitive advantages by improving its performance in the Triple Bottom Line aspects (Nidumolu *et al*., 2013; Muhamad *et al*., 2014).

In addition, studies indicate that companies that invest in Sustainability-oriented innovation (SOI) processes achieve superior financial performance. That is a consequence from the fact that companies that try to develop processes, products or services that harm less the environment, for example, improve their image, reputation and legitimacy with stakeholders (Aguilera-Caracuel; Ortiz-de-Mandojana, 2013).

Ghassim and Bogers (2019) investigated companies of the mining industry and proved that the Sustainability-oriented innovation (SOI) links stakeholder's engagement with profitability. They found that the company's ability to develop Sustainability-oriented innovation (SOI) is improved by the engagement of stakeholders, as it provides a wide range of knowledge that supports the efforts and results of innovations. With a greater capacity to innovate and a focus on sustainability, the company's profitability tends to be bigger and the stakeholder's engagement helps to overcome the uncertainties of innovation.

Maletič *et al*. (2016) found empirical evidence that innovation, when guided by sustainable practices, can improve economic results. The authors verified the effect of Sustainability-oriented innovation (SOI) on economic, quality, innovation, environmental and social performance. In addition, they found out a positive relationship between Sustainability-oriented innovation (SOI) practices and environmental performance and also between the development of competence to achieve innovations and improve the economic performance of industrial companies and service providers in five countries (Germany, Poland, Serbia, Slovenia and Spain).

Despite everything, many companies still act as if they should choose between products and/or services that involve better design and processes from a socio-environmental point of view and those that only offer financial benefits. However, they do not realize that when Triple Bottom Line (TBL) principles guide innovation processes, costs tend to decrease due to more efficient use of resources and the adoption of processes that promotes less waste and that improve the company's image (Nidumolu *et al*., 2013).

The literature indicates that innovation has the potential to improve social and environmental sustainability (Lin *et al*., 2013; Huang and Li, 2017), besides that, those are understood as components that are not causally related. About that, the organization with low performance in market and technical

innovation tends to have the managers prioritizing and dedicating themselves to the survival of the company, leaving aside socioenvironmental sustainability practices, except by imposition of a coercive force (Nidumolu *et al*., 2013; Islam *et al*., 2019).

Duque-Grisales and Aguilera-Caracuel (2019) have observed a moderating effect of the financial clearance in the relationship between the environmental, social and governance dimensions on financial performance. They highlighted that financial resources could facilitate the investment in other issues than their own operation, such as environmental, social and governance, because these resources can be appropriately designated.

When companies are successful in their process innovation efforts, they develop better quality products with better market performance, besides that, they reduce the production time cycle, what leads to an improved performance in a significant way (Rajapathirana and Hui, 2018). According to Guerrero-Villegas *et al*. (2017), innovation improves the relation between the adoption of corporate social responsibility practices and the performance of companies.

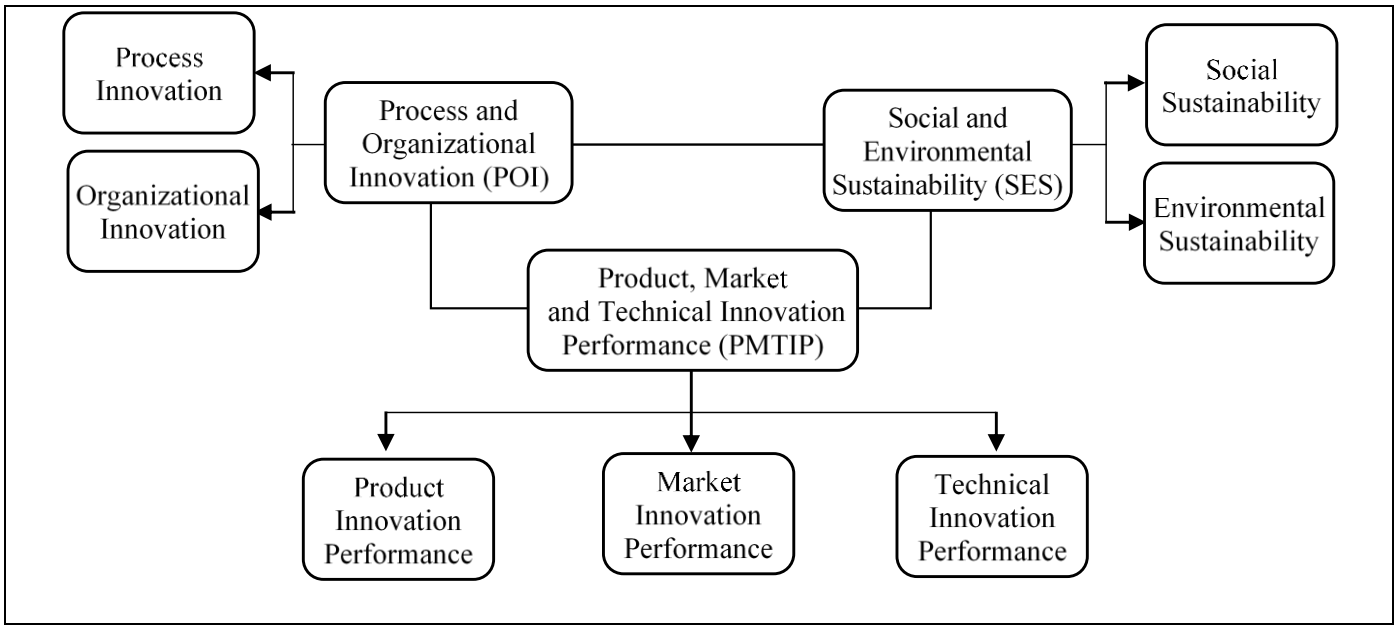
A company's proactive posture in developing new organizational processes and formats that improve sustainability practices, such as reducing CO2 emissions, reducing the use of energy and toxic materials, leads to the development of products and services that meet a demand for eco-friendly products, and also improves the company's sustainability indicators (Tsai and Liao, p.10, 2017).

The process of manufacturing products or providing services can cause of the environment's degradation. Thus, the design of "eco-friendly" products/services reduces the socio-environmental impacts caused by the manufacturing process, improving the company's socio-environmental indicators (Fuller and Ottman, 2004).

H_4: Process and organizational innovation, mediated by product, market and technical innovation performance has a positive and significant relation with social and environmental sustainability.

The established hypotheses define the theoretical research model (Board 1) with "process and organizational innovation", "product, market and technical innovation performance", "market and technical innovation" and "social and environmental sustainability".

Board 1 - Theoretic model



3 Research Methodology

3.1 Population, sample, and data collection

This research is descriptive and has a quantitative approach, since the relation between the Process and Organizational Innovation, Social and Environmental Sustainability and the Product, Market and Technical Innovation Performance of industrial companies was statistically verified.

The research population was formed by 288 industrial companies located in the Chapecó region, in Santa Catarina, Brazil. As for the minimum sample size, one of the criteria is the observation of the maximum number of predictors of the theoretical model. In this study there was a maximum of 4 predictors used, and parameters with a 5% significance level and statistical power of 80%. Thus, to detect a minimum R^2 value of 0.25, at least 41 cases are required (Hair et al., 2017).

The data collection occurred through the application of a questionnaire, using an online platform. There was no missing data identified because the instrument was configured to not allow the respondent to go ahead without answering all the statements. The sample consisted of accessibility and 66 responses were obtained. Three companies that were part of the same economic group were excluded, resulting in 63 valid questionnaires and the survey was applied in October and November of 2019.

Box plots analysis was performed using IBM SPSS Statistics software to identify possible outliers. Six indicators were identified and a maximum of 4 cases had outliers, deleting only the data, and generating missing data. No cases were deleted, since it was not identified as a typical response of a specific group of the population (Sarstedt and Mooi, 2014).

Statistical calculations were performed using SmartPLS software version 3.3.2 (Ringle et al., 2005). A variance-based PLS (Partial Least Squares) approach is preferable to covariance-based methods, since PLS imposes less strict restrictions on sample size and distribution (Chin et al., 2003). PLS is a SEM (Structural Equation Modeling) technique, which simultaneously evaluates a measurement model with the theoretical structural model (Chin, 1998). The application of the PLS model occurs in two stages. The first stage estimates the measurement model using confirmatory factor analysis to assess the reliability and

validity of the theoretical constructs. Then, the structural model's estimate examines the associations between the research constructs.

3.2. Measures

As a technique for data collection, it was used a questionnaire composed of 57 questions and Likert scale, which ranged from 1 (strongly disagree) to 5 (strongly agree). The assertions for each dimension in Board 2 are found in Appendix A.

Board 2 - Research construct

Code	Dimension	Authors
PI	Process Innovation	Shaukat *et al.* (2013); Lee *et al.* (2019); González-García *et al*. (2012)
OI	Organizational Innovation	Shaukat *et al*. (2013); González-García *et al*. (2012)
PIP	Product Innovation Performance	Kneipp *et al.* (2018); Bocken *et al.* (2019); Duque-Grisales and Aguilera-Caracuel (2019)
MIP	Market Innovation Performance	Kneipp *et al*. (2018); Bocken *et al.* (2019); Duque-Grisales and Aguilera-Caracuel (2019)
TIP	Technical Innovation Performance	Kneipp *et al*. (2018); Bocken *et al.* (2019); Duque-Grisales and Aguilera-Caracuel (2019)
SS	Social Sustainability	Nidumolu *et al*. (2013); Albareda and Hajikhani (2019); Ramadani *et al.* (2019)
ES	Environmental Sustainability	Nidumolu *et al*. (2013); Albareda and Hajikhani (2019); Ramadani *et al.* (2019)

Source: prepared by the authors.

4 Results and Discussion

4.1 Measurement model

The evaluation of convergent and discriminant validity determines the measurement model's validation. The convergent validity of the scales depends on the fulfillment of three criteria: loading of indicators must exceed 0.700 (Bagozzi et al., 1991; Hair et al., 2011; Hair et al., 2017), Composite Reliability (CR) must be higher than 0.700 (Bagozzi and Yi, 2012; Hair et al., 2011; Hair et al., 2012) and less than 0.950 (Hair et al., 2017) is recommended, this way the indicators with low and high loading were removed. Finally, the AVE - Average Variance Extracted is admitted if the value is higher than or equal to 0.500 (Hair et al., 2011; Hair et al., 2013).

The data to observe the convergent and discriminant validity conditions are valid and shown in Board 3.

Board 3 - Descriptive statistics and convergent and discriminant validity

Second-order Constructs	First-order constructs	Mean	S. D.	Range of loadings		CR	AVE	HTMT confidence interval does not include 1
				Min	Max			
Process and Organizational Innovation (POI)	Process innovation	3,090	1,439	0,808	0,867	0,881	0,711	YES
	Organizational innovation	3,222	1,350	0,700	0,804	0,798	0,570	YES
Product, Market and Technical Innovation Performance (PMTIP)	Product Innovation performance	3,450	1,370	0,819	0,834	0,866	0,683	YES
	Market Innovation performance	3,889	0,971	0,831	0,878	0,918	0,737	YES
	Technical Innovation performance	3,464	0,902	0,884	0,891	0,918	0,788	YES
Social and Environmental Sustainability (SES)	Social Sustainability	3,587	1,248	0,804	0,870	0,876	0,701	YES
	Environmental Sustainability	3,099	1,451	0,732	0,870	0,869	0,624	YES

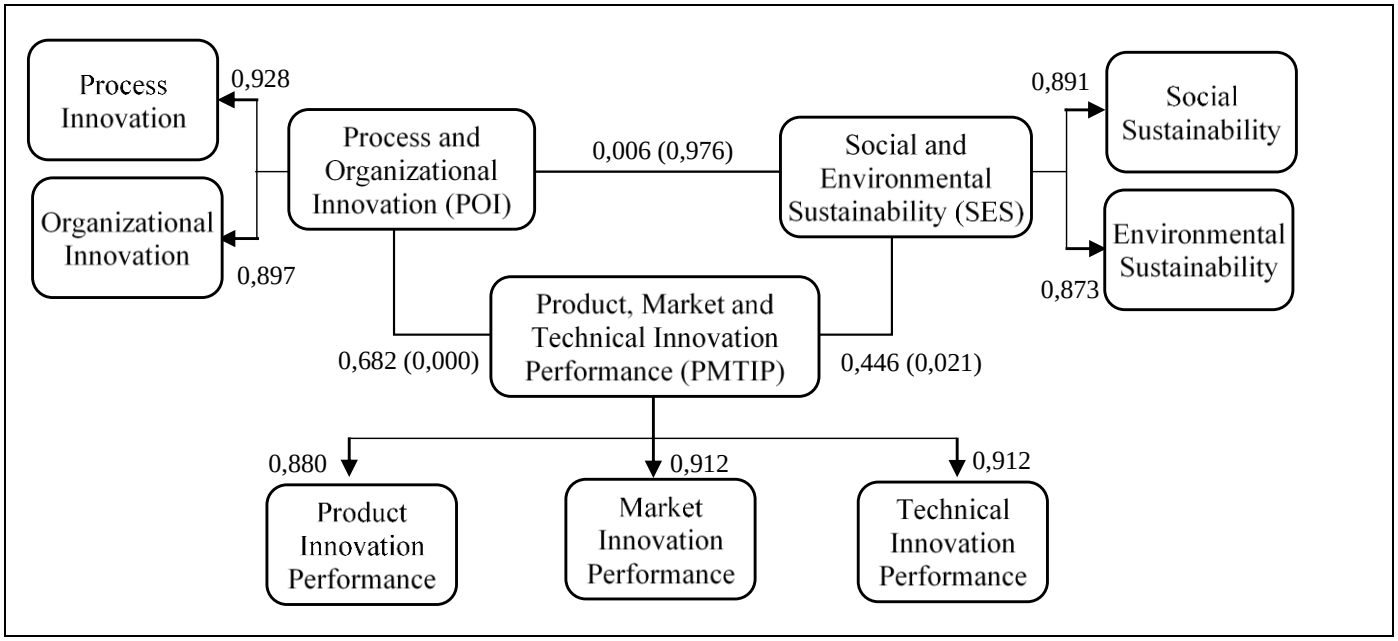
Source: survey data.

To define the discriminant validity, the HTMT (Heterotrait Monotrait Ratio) proposed by Henseler et al. (2015) was verified, which should assume a lower value than 1.00. Thus, HTMT (Heterotrait Monotrait Ratio) does not include 1, verified by a bootstrapping procedure calculated at a 95% confidence interval, considered adequate.

4.2 Structural Model

A PLS-SEM approach was selected to estimate the results' evaluation model. This procedure raised the generation of path coefficients and R^2 squares. R^2 squares were calculated to assess the predictive power of the structural model, innovation performance explained 20.20% of the variation in sustainability. A bootstrapping technique with a 10,000 re-sampling was performed by the SmartPLS software to calculate the path estimates and p-value to test the significance of the hypotheses (Board 4).

Board 4 - Research model



Source: survey data.

The 5th Board summarizes the empirical results to meet the research objective, testing the following hypotheses.

Board 5 - Structural model: decomposition of effects

Hypotheses	Structural Path	Total Effect	p-value	Hypotheses Testing*
H1	POI➔SES	0,310	0,011	Supported
H2	POI➔ PMTIP	0,682	0,000	Supported
H3	PMIP➔ SES	0,446	0,021	Supported
H4	POI ➔ PMTIP ➔ SES	0,310	0,011	Supported

Significance: p-value ≤ 0,05

Source: survey data

Concept related results of mediation analysis regarding hypothesis H4 can be defined as the relation between an independent variable and the dependent one, mediated by a third variable that carries itself the effect of the independent variable on the dependent one (Baron and Kenny, 1986; Hair et al, 2017), understood as complete mediation.

A bootstrapping test of the indirect effect was performed, which is suitable for evaluating the effect of mediating variables in the PLS-SEM method. It was implemented in the SmartPLS 3 software (Hair et al., 2017; Ringle et al., 2015). The mediating approach between innovation and sustainability, with performance as a mediating variable had the indirect effect of the coefficients between innovation and performance. However, there was a positive but not distinguished sign in the direct effect between innovation and sustainability, so it was characterized as a complete mediation.

4.3 Discussion of Research Results

The research realized that innovation has an indirect effect on sustainability through performance. Performance depends on innovation. Therefore, if an organization strives to improve performance, it needs to focus on creating an environment that is opened to innovation. This study demonstrated a positive and significant relationship between innovation and performance and that a manager who focuses on improving innovation also helps to improve performance.

Process innovation can use manufacture, goods production, or services, either if they are new or significantly improved. It also can use a new or significantly improved logistics system or delivery method or it can use new or significantly improved equipment and techniques in production support activities, such as: production planning and production control software, IT infrastructure in performance measurement, quality control, purchase, maintenance or computing.

Innovation can also be organizational, making significant changes in relationship with other companies or public and nonprofit institutions, such as the establishment of alliances, partnerships, outsourcing or subcontracting activities for the first time. Innovation can occur by making significant changes in new media's concepts/strategies, or the use of techniques for promoting product marketing. There could also be implemented new work methods organization to improve the distribution of responsibilities and of the decision-making power, such as the establishment of teamwork, decentralization, or departments integration.

As a conclusion, the managerial effort in process and organizational innovation can be defined as a mechanism for improving performance in product, market, and technical innovation of industrial companies in Chapecó, Santa Catarina, Brazil. It was clear that process and organizational innovation have no direct effect on social and environmental sustainability, but they have an indirect effect mediated by performance.

As for the performance in product innovation, there is the likely effect of introducing a new product (good or service) or significant changes in aesthetics, design or other subjective changes, at least in one of the products, or even introducing a new or significantly improved product (good or service) to the national market. The market performance results in maintenance and expansion of the company's market share, as well as the opening of new markets. Finally, technical performance provides an improvement in the quality of goods or services, expansion in the variety of goods or services offered, powered by operational flexibility, increase in production or service provision capacity, reduction of production costs or of services provided.

As a conclusion, good performance helps socio-environmental sustainability. Social sustainability, defined as documented and formal practices that clarify the parameters encouraged in the company's relationship with interested ones, the search for stakeholder's participation in the review of the formal document, the relevant observation of actions to develop the local community by generating work and income, as well as measures to reduce poverty and increase inclusion in society. Finally, the encouragement of the voluntary work of its employees in the community and recognition of the importance of the voluntary work of its employees, disseminating it through murals, an internal newspaper, or a local newspaper.

Environmental sustainability, defined as the company's understanding and evaluation of the impacts of its activities in the environment (such as emission of pollutants and high consumption of energy, water

and fuel), combined with the maintenance of indicators and reports to measure and accompany them. Also, the search to use materials that reduce damage in the environment in its processes and the discussion of partnerships with suppliers to return discarded materials to the manufacturer. An effective way to reduce environmental impacts ans raise awareness is the promotion of environmental education for employees, their families, and the community.

In recent years, some studies have investigated the relationship between process and organizational innovation and its effect on product, market, and technical performance (Gunday et al., 2011; Shaukat et al., 2013 and Lee et al., 2019). The results confirm that process and organizational innovation benefits the performance of product, market, and technical innovation. However, it does not directly predict socio-environmental sustainability, confirming the results of some previous studies (Muhamad et al., 2014; Moyano-Fuentes et al., 2017).

The conclusions of this article indicated that good performance creates a favorable environment for socio-environmental practices. Therefore, there is evidence that financial resources facilitate the efforts to combine innovation with environmental and social sustainability practices (Duque-Grisales and Aguilera-Caracuel, 2019).

5. Conclusions

The aim of the study was to analyze the relationship between process and organizational innovation, performance in product, market and technical innovation and social environmental sustainability. The study proposed a theoretical that provided insights to understand the mechanisms of this relationship, analyzing the impact between innovation and sustainability, mediated by performance.

The literature review indicates the existence of several studies relating innovation to performance; besides that, few studies relate performance to the socio-environmental dimensions of sustainability. This relation has implications since institutions with good performance find a favorable environment for socio-environmental sustainability. In the other hand, organizations with a lack in performance do not have available resources and time of managerial dedication to their socio-environmental practices.

This result is possibly occasioned by the fact that companies that are more aware of environmental sustainability are also concerned about preserving good environmental conditions for the surrounding community, so they adopt cooperation practices that involve the education and the environmental awareness of stakeholders. In addition, companies that are concerned about social aspects of sustainability seek, in their internal public, ways to contribute and improve the life quality of those close to them, starting by buying from and training closer suppliers, what generates business opportunities, income and tends to improve the social indicators of the surrounding community. Another theoretical contribution is focused to fill the lack of Sustainability-oriented innovation (SOI) studies aimed at micro, small and medium-sized companies, as warned by Klewitz and Hansen (2014).

The practical contributions point to the importance attributed by managers of micro, small and medium companies to the need of considering innovation elements for good performance, and in the sequency adopting sustainable practices to seek the global sustainability of the enterprises.

The limitations of the study were the condition of a non-probabilistic sample, whose results should

be simply considered, avoiding generalization, even though they provide important insights about the investigated companies' behavior. Additionally, the use of a questionnaire as a data collection instrument does not allow to deepen the qualitative aspects of innovation, sustainability practices and the reasons for their adoption.

Future studies may consider the influence of coercive forces in organizational performance and that could indirectly interfere in socio-environmental sustainability. It is also recommended to implement the research in other regions of the country, to verify whether the behavior of micro, small and medium-sized companies is similarly manifested. Another possibility is to apply a qualitative study, using in-depth interviews to assess the motivations that drive companies to adopting innovative and sustainable practices. Additionally, other performance criteria of the companies can be considered.

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Appendix A

CODES	ASSERTIVES
PROCESS INNOVATION	
PI_01	In the last three years, the company started to use a new or significantly improved method of manufacturing or producing goods or services.
PI_02	In the last three years, the company started using a new or significantly improved logistics system or delivery method for its inputs, goods, or services.
PI_03	In the last three years the company started using equipment, and new or significantly improved techniques in production support activities, such as: production planning and control software, performance measurement, quality control, purchase, maintenance or computing / infrastructure from you.
ORGANIZATIONAL INNOVATION	
OI_01	In the past three years, the company has made significant changes in relations with other public or non-profit companies or institutions, such as the establishment of alliances, partnerships, outsourcing or subcontracting activities for the first time.
OI_02	In the last three years, the company has made significant changes in the concepts / strategies of new media or techniques for promoting product marketing, for example; new ways of placing products on the market or sales channels; or new pricing methods for the sale of goods and services.
OI_03	In the last three years, the company has implemented new methods of work organization to improve the distribution of responsibilities and decision-making power, such as the establishment of teamwork, the decentralization or integration of departments, etc.
PRODUCT INNOVATION PERFORMANCE	
PIP_01	In the last three years the company has introduced a new or significantly improved product (good or service) for the company, but already existing in the national market.
PIP_02	In the last three years, the company has made significant changes in aesthetics, design, or other subjective changes in at least one of the products.
PIP_03	In the last three years, the company has introduced a new or significantly improved product (good or service) for the national market.
MARKET INNOVATION PERFORMANCE	
MIP_01	It allowed to maintain the company's participation in the market
MIP_02	Expanded the company's market share
MIP_03	Allowed to open new markets
TECHNICAL INNOVATION PERFORMANCE	
TIP_01	Improved the quality of goods or services
TIP_02	Expanded the range of goods or services offered
TIP_03	Increased production or service capacity
TIP_04	Reduced production or service costs

SOCIAL SUSTAINABILITY	
SS_01	The company has a formal document that clarifies the parameters encouraged in its relations with interested parties.
SS_02	The company seeks to involve its stakeholders (employees, customers, suppliers, community, and management) in the preparation and review of this document.
SS_03	The company considers it important and applies actions for the development of the local community through the generation of work and income, as well as measures to reduce poverty and increase inclusion before society.
SS_04	The company encourages the voluntary work of its employees in the community and recognizes the importance of the voluntary work of its employees, promoting it through murals, an internal newspaper, or a local newspaper.
ENVIRONMENTAL SUSTAINABILITY	
ES_01	The company knows, understands, and evaluates the impacts of its activities on the environment (such as emission of pollutants and high consumption of energy, water, and fuel), maintaining indicators and reports to measure and monitor them.
ES_02	The company seeks to use materials that can reduce damage to the environment in its processes. For example: it seeks to control and reduce noise, visual and air pollution caused by its processes.
ES_03	The company discusses partnerships with suppliers, aiming to return discarded materials (such as expired products, batteries, used tires and used lamps, packaging, etc.) to the manufacturer.
ES_04	The company promotes environmental education for employees, their families, and the community, as an effective way to reduce environmental impacts.